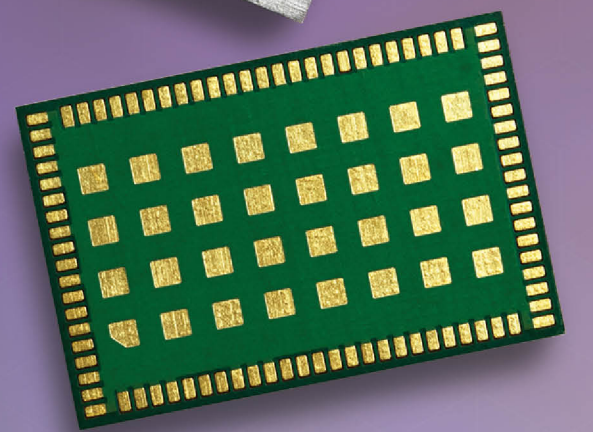


# Coral Accelerator module

Accelerating the AI & IoT solutions that enrich our lives



In collaboration with Google

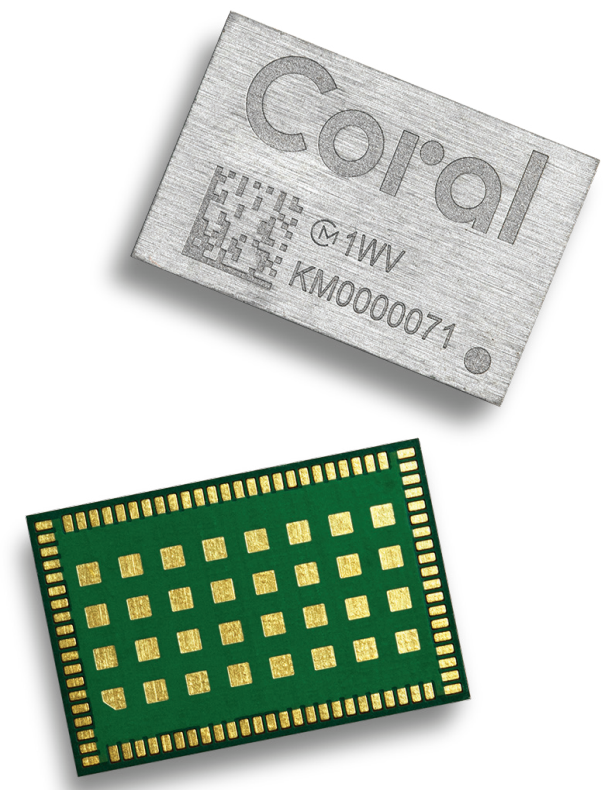
**muRata**  
INNOVATOR IN ELECTRONICS



# Murata and Google team to develop world's smallest AI module with Coral intelligence

1/6/2020

Murata Manufacturing Co., Ltd.



**Smyrna, GA, January 6, 2020** – Murata Electronics Americas announced today that it has created the world's smallest artificial intelligence (AI) module in partnership with Google – the Coral Accelerator Module. The custom designed module packages Google's Edge TPU ASIC within a miniaturized footprint. The solution overcomes some of the most pressing challenges in implementing AI solutions by delivering superior noise suppression and simplifying printed circuit board design in a smaller footprint. Miniaturization is key as all board space must be optimized to achieve highly robust functionality in space constrained operations. The result of this collaboration is a solution that speeds up the algorithmic calculations required to execute AI.

"The Coral Accelerator Module is a brilliant offering, and Murata delivers an important building block for the AI Edge ecosystem. This module is a game-changer in enabling the next generation of intelligent devices. The trust Google placed in our technology, process, and material leadership speaks volumes about the robustness of Murata's Multi-Chip Module process," stated Sean Kim of Murata's Connectivity product marketing group.

"Coral enables new applications of on-device AI across many industries, from manufacturing to healthcare to agriculture. Working with Murata to make the Coral Accelerator Module – with Google Edge TPU – available in a robust, solderable, and easy-to-integrate package means that more customers can include Coral intelligence inside their products in more environments," said Vikram Tank, Product Manager for Coral.

The goal of Coral is to enable AI applications running at the device level to quickly move from prototype to production. Coral provides the complete toolkit of hardware components, software tools, and pre-compiled models for building devices with local AI. The AI module is an integral part of the fully integrated Coral platform, which can be implemented in a myriad of applications across numerous industries.

Murata worked closely with Coral to ensure that the AI module helped enable the flexibility, scalability, and compatibility for integration into applications deploying the Coral technology. Toward this end, Murata leveraged its global resources and decades of R&D in the areas of high-density design and component integration.

More information on the technology can be found at [www.coral.ai](http://www.coral.ai).

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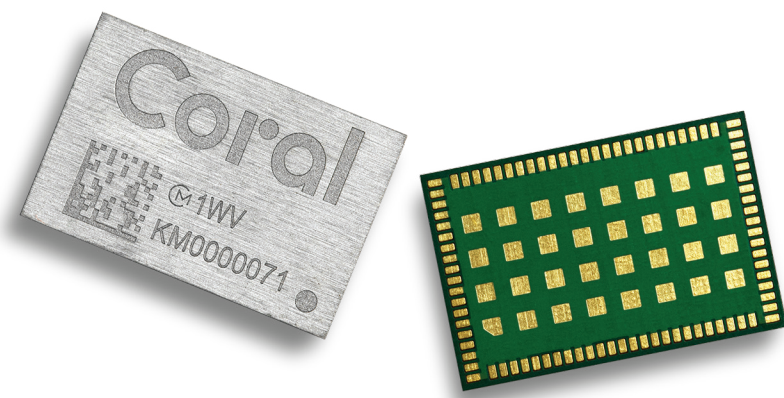
## Murata in Brief

Murata Manufacturing Co., Ltd. is a worldwide leader in the design, manufacture and sale of ceramic-based passive electronic components & solutions, communication modules and power supply modules. Murata is committed to the development of advanced electronic materials and leading edge, multi-functional, high-density modules. The company has employees and manufacturing facilities throughout the world. For more information, visit Murata's website at [www.murata.com](http://www.murata.com)



# Coral Accelerator Module

Murata and Google develop the world's smallest AI module



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## Overview



## The Coral Accelerator Module enables big AI in a small package

Coral engineers have packed the Google Edge TPU machine learning co-processor into Murata's compact package technology to create a solderable multi-chip module (MCM) enabling power-efficient and high-performance ML inferencing at the edge.

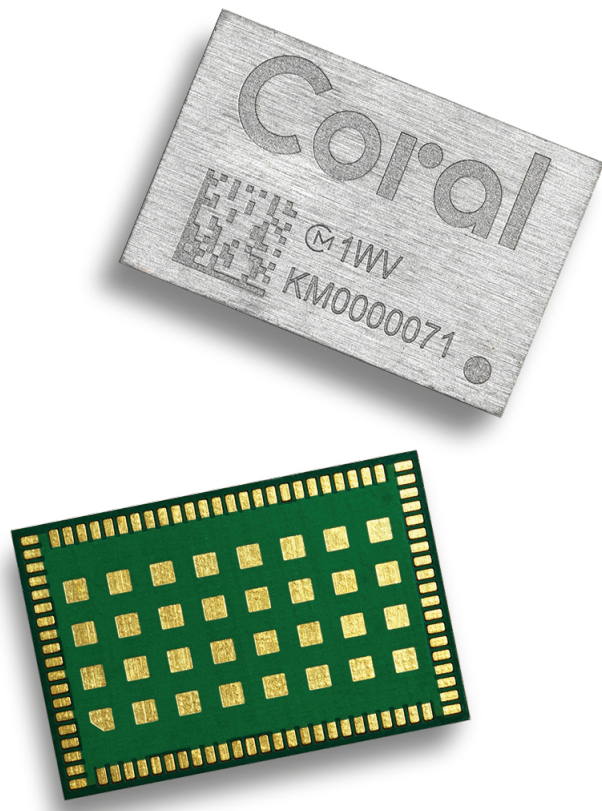
The smaller footprint simplifies the design of the printed circuit board without sacrificing performance.

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# Strengths



- Supports operation at up to 4 TOPS (trillion operations per second).
- Boosts power efficiency by ensuring power consumption of only 0.5 W per 1 TOPS.
- Supports PCIe Gen 2 and USB 2.0 interfaces.

The Accelerator Module is a multi-chip module (MCM) integrating the Edge TPU and exclusive power control technology. The Edge TPU, a small-but-mighty ASIC designed especially for the edge by Google, speeds up model estimation times while using very little power.

Murata's compact package technology and power supply design (noise suppression) make it possible to achieve a high-performance while maintaining a small form factor, a key to maintaining robust functionality in devices with limited space.

## Model estimation time comparison

When implemented on the latest embedded CPU or the Coral Dev Board, a comparison of model estimation times using the TensorFlow Lite format shows that inference time is substantially reduced and confirms that genuinely high performance can be achieved.

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# About Coral

Coral is a local AI platform that helps bring on-device AI application ideas from prototype to production. Coral offers a platform of hardware components, software tools, and pre-compiled models for building devices with local AI, creating a flexible development system that makes it easy to grow embedded AI products into reality. By working with creators, designers, engineers, manufacturers, and industry, Coral is helping to build truly beneficial AI for our world.

## Agriculture

Soil analysis, sorting produce, disease detection, precision agriculture, etc.



## Healthcare

Patient care, medical image generation, low-cost diagnosis, home care, etc.



## Manufacturing

Quality control, safety monitoring, predictive maintenance, etc.



## Automotive

Safe driving assistance, status monitoring, seamless control of vehicle systems, operation verification, etc.



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# System configuration

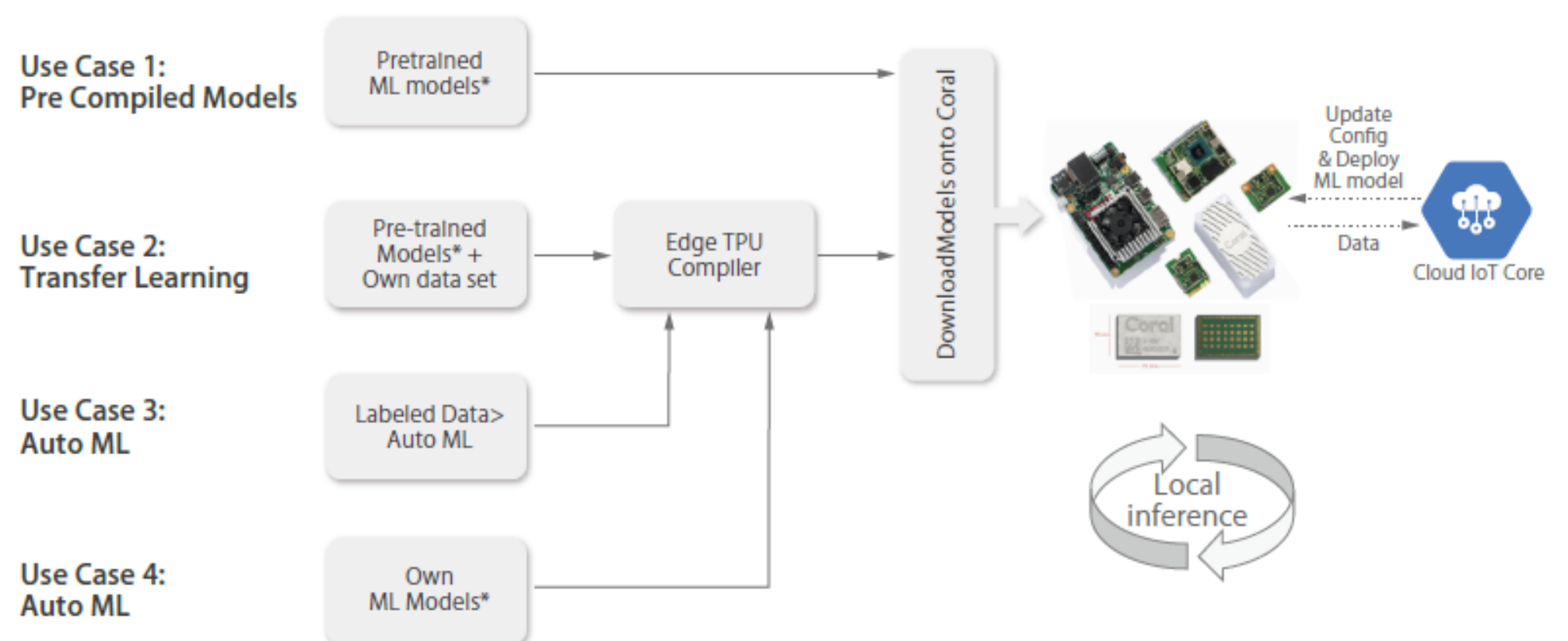
## Using pre-compiled models

Either pre-compiled machine learning models or transferred learning data utilizing such models is available.

## Using custom models

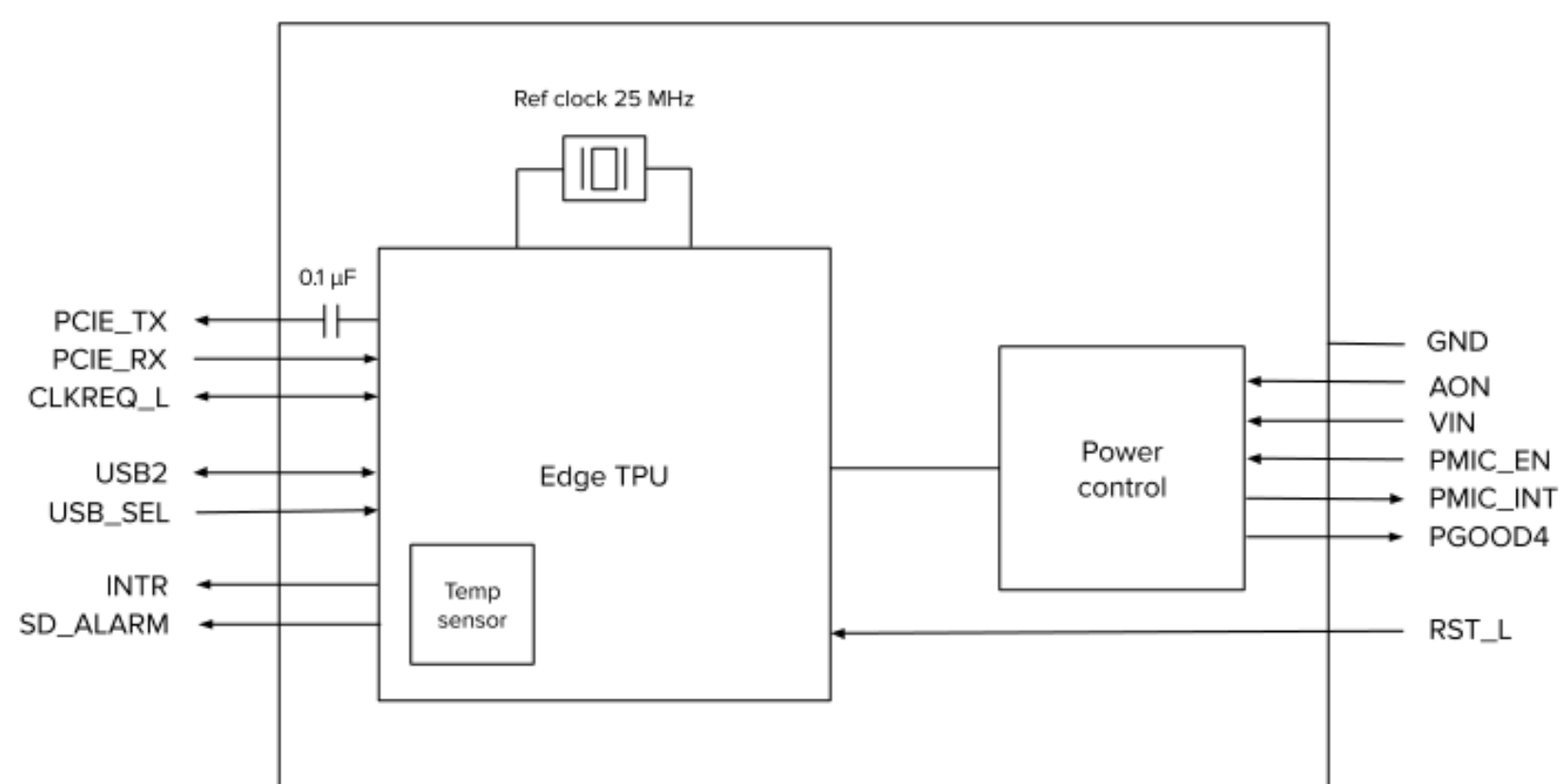
Classroom data is collected using automated machine learning (AutoML) and output in a binary format compatible with Coral and Edge TPU.

Existing machine learning model workflows are used to generate TensorFlow Lite data.



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# Basic specifications



- Fast and energy-efficient learning inference (4TOPS@2W)
- Surface-mount module incorporating Edge TPU and PMIC
- Product size: 15.00 × 10.00 × 1.5 mm
- Interfaces: PCIe and USB 2.0
- RoHS compliant

[View datasheet](#)

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# Contact

Use the [Coral contact sales form](#) to make inquiries about the solution described above.

Note: Murata is unable to provide product support or respond to questions regarding the product.

**More information**